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Growing Annual Flowering Plants



FARMERS' BULLETIN No. 1171
U. S. DEPARTMENT OF AGRICULTURE

SO MANY VARIETIES of annual plants are available that a gardener can readily find ones suited to practically any set of conditions he may be confronted with. In a general bulletin such as this it is not possible to describe all of these plants, and only the more commonly grown ones are listed in table 1. Our country is so large and the climatic conditions are so different in the various parts that it is not possible to give detailed cultural information applicable to all. The performance of an annual plant depends not only on climate but also on many other factors including type of soil, fertility, quality of seedlings, and the general care given the growing plants. Over these conditions, except climate, a gardener has some control; the only thing he can do about climate is to grow only those plants that are suited to the particular conditions prevailing.

The cultural information included is applicable to all parts of the country. Some judgment, however, must be exercised as to the best time to plant, since certain annuals that perform best when fall-planted in the South would not survive if planted at the same time in the North. The time to plant and other cultural practices are already well known to experienced gardeners, and a beginner will find it advisable to seek information from such local sources before sowing seeds.

In recent years new and improved methods of starting seedlings have been devised; they are discussed in this bulletin. The methods are well adapted to home use, especially when a glass-enclosed sun porch is available; a window with full-sun exposure is also satisfactory. If vermiculite or sphagnum moss is used, the flats are very light in weight and on sunny days in early spring when the temperature is above 50° F. the flats may be set outdoors and brought in each night. This treatment will aid in producing strong, sturdy plants and is well worth the additional trouble.

GROWING ANNUAL FLOWERING PLANTS ¹

By S. L. EMSWELLER, *principal horticulturist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration*

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INTRODUCTION

ANNUAL FLOWERING PLANTS are very useful for rapid, but temporary, effects in gardens and also to furnish cut flowers during the period when perennials are generally out of bloom. When planted in clumps in the open spaces between shrubs and herbaceous perennials, they furnish spots of color and add charm. Many annuals grow and flower so rapidly from seed sowing that they can be interplanted among early-flowering spring bulbs and other perennials and thus provide a pleasing effect even though the foliage of the permanent plants becomes unsightly. Annuals can conveniently be divided into two types: hardy and tender. Some of the hardy annuals may be sown in the fall in many sections of the country or planted outdoors soon after frost is out of the ground. The tender sorts will not tolerate frost and so must be started indoors for early flowering or outdoors after the soil is warm for late flowering.

¹Original version of this bulletin was written by L. C. Corbett and F. L. Mulford, formerly of this Bureau.

There are many different kinds of annuals and many varieties of some of them; so it is rather difficult to choose which to grow. Each year new varieties listed in the flower-seed catalogs add to the many types now available. In selecting what types to grow, the beginner should talk with other gardeners who have had experience in his locality and can tell him what varieties are best suited to his particular conditions. In table 1 (p. 6) information that should be helpful is listed for a large number of annuals.

CULTURAL PRACTICES

Soil Preparation

Any good garden soil will produce satisfactory annuals. They are quick-growing plants and require a fertile soil that does not dry out too rapidly and yet is well drained. Unfortunately many of the plots where annuals are to be grown are made from the subsoil from excavating a cellar or, when they are next to a foundation, from all the left-over plaster, cement, and debris covered with a few feet or inches of poor soil. It is a waste of time to try to grow good annuals on such plots. When soil conditions such as described exist, it is necessary to remedy them by the addition of organic matter. Sometimes when the soil is a very heavy clay, sand should be added.

The best source of organic matter when an annual flower bed is desired for immediate use is one of the various animal manures. Well-rotted stable or chicken manure and prepared sheep or cow manure are all very good. Other useful materials are cottonseed meal and bonemeal. There should be as much cow manure, or even rotted horse manure, worked into the soil as can be done reasonably. Less chicken manure should be used, as it is several times as rich as cow or horse manure. Prepared cow and sheep manure can be used at the rate of 1 pound for 3 square feet and cottonseed meal and bonemeal at the rate of 1 pound for 5 square feet. All these materials should be thoroughly worked into the soil.

The manures are especially beneficial in modifying soil texture; but when the soil is extremely poor to start with, it is usually necessary to add more readily available fertilizers also. As a rule, a complete fertilizer such as a 4-8-4 or a 5-10-5 mixture is very satisfactory. It may be applied at the rate of about 1½ pounds to 100 square feet. It should be broadcast on the soil and thoroughly worked in just before planting.

When the location for annual flowers can be determined far in advance of planting, an ideal soil can be made by rotting sods of bluegrass in a rather heavy clay loam for a year and then mixing in equal quantities of rotted manure, leafmold, and sand. The manure and sod can be rotted together for a year if convenient. A specially prepared soil of this kind will probably not be benefited much by another coat of manure the second year, but after that it should have annual dressings. Where good garden soil or other rich soil of suitable texture is available, probably the most common practice is to dig out a bed of suitable depth and fill it with this garden soil well enriched with rotted manure. For permanent beds careful preparation of good soil of proper texture is well worth the effort.

When larger areas are used for flowers, as in a special garden like a vegetable garden or part of one that can be handled with a plow, self-improvement crops such as crimson clover and vetch in winter

or cowpeas in summer may be used to enrich the soil and thus prepare it for another season's crops. It is possible sometimes to adapt some of these soil-improvement crops to the smaller areas of flower beds; but it is seldom advisable, as the limited quantity of fertilizing materials usually needed can ordinarily be provided.

Starting the Plants

Ornamental annual plants can be started readily from seed in the spring and will give blooms or satisfactory foliage effects the same season. Nearly all of these can be started in the open ground over at least a large part of the United States and will give the desired results before they are killed by frost. In order to get a longer season of effect from the plants, many gardeners usually start all their plants under glass or start those for early plantings that way. In the more northern sections of the country some kinds must be started in this way so that the season will be long enough for them to mature. Others must be started under glass so that they will become established before the coming of dry or hot weather, which would be injurious to the young plants but would not affect established ones.

All the kinds of plants mentioned in this bulletin can be propagated from seed. Seeds of a few must be sown where the plants are to mature, as they will not stand being moved. Many may be sown where they are to grow, but most of them are helped by one or two transplantings.

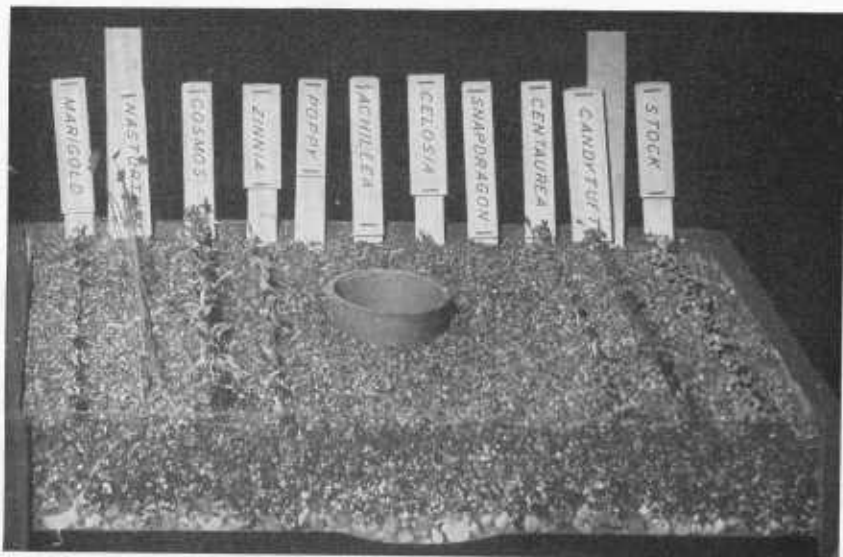
Because better plants are obtained by transplanting, most annuals are sown in seedbeds and moved to their permanent places. Such seedbeds should be in well-prepared, mellow soil, preferably somewhat protected from drying winds. If the soil is not mellow and moisture conditions are not exactly right, the seedlings, especially those from small seeds, will have trouble breaking through any crust that may form. Protection from wind also helps to maintain uniform moisture conditions. The timely use of a watering can is often a great help in promoting germination, but care should be taken not to use too much water. Seedbeds require frequent light waterings rather than the infrequent drenchings best suited to more mature plants.

Seeds may be sown either broadcast or in rows. Inexperienced gardeners should plant seeds in rows, especially slow-germinating seeds, as quick-starting weeds can be more readily recognized and removed with less danger of disturbing the germinating seeds. As a rule, the smaller the seed the shallower the depth of planting. Very small seeds, such as petunia and snapdragon, are very lightly scratched into the soil with a coarse comb. They are sometimes covered with a very light grade of cheesecloth to facilitate watering and afford some protection against their washing out of the soil. Such covering should be removed just as soon as the small seedlings are visible. Large seeds, such as nasturtium, China-aster, and sunflower, should be planted $\frac{1}{2}$ to $\frac{3}{4}$ inch deep, at the shallower depth in heavy soils.

When early flowering of annuals is desired, it is necessary to start the seedlings in some type of protected plant structure such as a hotbed, a coldframe, or a greenhouse or in a flat in a sunny window. It is not the scope of this bulletin to discuss coldframes, hotbeds, or greenhouses, which are amply described in Farmers' Bulletin 1318, Greenhouse Construction and Heating, and Farmers' Bulletin 1743, Hotbeds and Coldframes.

Two methods of starting seedlings in media other than soil have been developed by the United States Department of Agriculture. One of these utilizes shredded sphagnum moss and the other expanded vermiculite as the seedbed medium. The sphagnum-moss method is described in Leaflet 243, *Sphagnum Moss for Seed Germination*.

Vermiculite is an expanded form of mica that occurs in deposits in many parts of the world as hydrated magnesium-aluminum silicate. When seedlings are started in flats with vermiculite as the medium, the best results are obtained when provision is made for subirrigation. This is supplied by means of a watertight-paper insert made by turning up the edges of the paper to form a flat container about $\frac{1}{2}$ inch deep and of a length and width sufficient for a snug fit in the bottom of the flat. Any watertight fiber-resin paper is satisfactory; Neponset inserts made of such paper are available in standard sizes to fit all flats. When the insert is in place, it is filled with coarse gravel, and a



Flat with one side made of glass, to show paper insert, gravel, and layers of vermiculite.

$2\frac{1}{2}$ - or 3-inch clay pot is set in the center, and the flat is half filled with a coarse grade of vermiculite. Next the flat is almost filled with a fine grade of vermiculite, and sufficient water is then applied in the pot to subirrigate the vermiculite and eventually wet the surface and settle the vermiculite.

Seeds may be sown in rows or broadcast on the surface of the vermiculite. Large seeds are planted in rows, and fine seeds such as petunia and snapdragon are generally broadcast on the surface. It is possible to grow seedlings in vermiculite without subirrigation, but more care in watering is necessary. When subirrigation is not used, the flat is half filled with coarse vermiculite and the fine grade is then used to fill the flat to within $\frac{1}{2}$ inch of the top. As a rule, it is advisable then to cover the seeded flat with a thin layer of sphagnum moss or a pane of glass to prevent too rapid drying-out of the surface.

Seeds planted in vermiculite generally germinate more readily than in soil, and the percentage of germination is higher. There is also no trouble with weeds or damping-off fungi, since the vermiculite is prepared at very high temperatures that kill all disease organisms and weed seeds that might be present. The vermiculite also affords excellent aeration and a constant moisture supply around the seedling roots, both being important factors in the growth of strong seedlings.

Since vermiculite does not contain enough nutrients to maintain good plant growth, it is necessary to supply some sort of fertilizer to the young seedlings. Water containing one tablespoonful per gallon of a complete fertilizer such as 4-12-4 or 5-10-5 should be used to feed the seedlings just as soon as they emerge and at weekly intervals until they are removed from the flat. If the seedlings are kept in the flat for an extended period, it may also be necessary to supply additional nitrogen. This may be done by adding a teaspoonful of nitrate of soda or a half teaspoonful of sulfate of ammonia or nitrate of ammonia per gallon of water. When the seedlings are to be transplanted outdoors they can be hardened off to some extent by withholding all fertilizer for a few weeks.

Seedlings started in vermiculite transplant very well, probably because of the much heavier root system developed in vermiculite than in soil. The roots are rarely injured when the seedlings are removed, especially if the flats are allowed to dry out slightly before transplanting is started.

Fairly satisfactory seedlings can be grown in a vermiculite flat in a sunny window or a glassed-in porch. It is also possible to produce very fine plants by use of artificial lights only. This method, developed at the Plant Introduction Garden, Bureau of Plant Industry, Soils, and Agricultural Engineering, Glenn Dale, Md., requires the use of a lighted box. It is described in detail in a Bureau of Plant Industry, Soils, and Agricultural Engineering mimeograph, *Plant Propagation Under Fluorescent Lamps*.

Watering

Throughout much of the United States the natural rainfall on a well-prepared bed would be sufficient in most seasons. Beds close to a house, so that much of the rain is kept off by the building, need to have the natural rainfall supplemented by occasional waterings. Irrigation is necessary in dry climates, in most climates in unusually dry seasons, and on sandy or other unusually dry soils.

The amount and frequency of watering depend upon the dryness of the atmosphere and the soil. A well-prepared, retentive soil 2 feet deep would probably not require watering oftener than once a week except possibly in the driest parts of the country, where the evaporation is excessive. Gravelly or sandy soils, especially if they are not well provided with organic matter, may require a thorough watering every other day. The watering should be done as infrequently as the soil and climatic conditions permit. Only experience can teach the best method. Too frequent waterings are as bad as too long intervals between waterings. If the plants are watered too often, the surface soil is kept moist and root growth is encouraged near the surface. Then unusual drying conditions will dry the feeding ground of the roots and kill them. But if the roots are required to go deeper because the surface becomes dry for 2 or 3 inches between waterings, there is less danger of unfortunate results from unusual conditions or a slight deviation from the regular schedule of watering.

TABLE 1.—*Information on the annuals discussed*

Common name	Principal flower colors	When to plant seed ¹	Sun or shade	Height	Spacing between plants
Ageratum	Blue, violet, rose, white	1, 2	Sun	<i>Inches</i> 6-20	<i>Inches</i> 10-12
Babysbreath	White, rose, carmine	1, 2	do	12-18	10-12
Balsam	Pink, red, salmon, lavender, white	1, 2, 4	do	20-28	12-14
Calendula	Apricot, yellow, orange	1, 2, 4	do	14-18	8-10
Calliopsis	Yellow, orange, maroon, crimson, mahogany	1, 2, 4	do	18-24	10-14
Candytuft	Crimson, lavender, white	1, 2, 3	do	9-12	8-12
China-aster	Blue, crimson, pink, purple, white	1, 2, 3, 4	do	12-24	10-12
Clarkia	Pink, salmon, rose, carmine, purple, white	1, 2	Partial shade	18-24	10-12
Cockscomb	Crimson, yellow	1, 2	Sun	16-30	10-12
Cornflower	Blue, pink, red, white	2, 3, 4	Partial shade	30-48	12-14
Cosmos	Rose, crimson, yellow, orange, pink, white	1, 2, 4	Sun	18-40	10-12
Dahlia	Apricot, orange, crimson, lavender, yellow	1, 2	do	8-12	12-14
Forget-me-not	Blue, rose, white	2, 3	Partial shade	20-24	12-14
Four-o'clock	Red, pink, lilac, yellow, white	1, 2, 4	Sun	12-18	10-12
Gaillardia	Red, yellow, sulfur, orange, maroon	1, 2, 3, 4	do	18-24	10-12
Globe-amaranth	Purple, crimson, rose, white	1, 2	do	18-24	10-12
Godetia	Rose, carmine, pink, salmon, blue, white, lavender	1, 2, 3	Partial shade	18-24	12-14
Larkspur	Blue, rose, lilac, mauve, lavender, white, red	1, 3, 4	Sun	18-48	6-8
Lupine	Blue, rose, white	1, 2	do	18-24	6-8
Marigold	Yellow, orange, red, bronze	1, 2	do	6-24	10-14
Morning-glory	Blue, crimson, scarlet, white	1, 2	do	<i>Feet</i> 8-12	24-36
Nasturtium	Rose, salmon, red, yellow, mahogany, white	1, 2	do	<i>Inches</i> ² 12	8-12
Pansy	Yellow, blue, purple, bronze, red, white	1, 3	Sun and partial shade	6-10	6-8
Petunia	Red, salmon, pink, blue, cream, lilac, white	1, 4	Sun	8-24	12-14

Phlox	Red, salmon, rose, pink, lilac, violet, white	1, 2	do.	6-12	6-8
Pink	Pink, rose, scarlet, white	1, 2, 4	do.	6-16	8-12
Poppy	Pink, salmon, scarlet, apricot, gold, white	1, 3, 4	do.	12-16	6-10
Portulaca	Pink, red, salmon, yellow, white	1, 2, 4	do.	6-9	10-12
Rudbeckia	Orange-yellow, mahogany	1, 2	Sun and partial shade	20-24	10-14
Salpiglossis	Yellow, crimson, purple, white	1, 2	Sun	24-30	10-12
Scabiosa	Blue, red, rose, purple, white	1, 2	do.	18-36	12-14
Scarlet sage	Brilliant scarlet, blue	1, 2	do.	8-12	8-12
Snape-dragon	Scarlet, yellow, rose, pink, purple, white	1, 2, 4	do.	10-36	6-10
Spider plant	Salmon-pink	1, 2, 4	do.	30-36	12-14
Stock	Red, blue, yellow, copper, purple, pink, lavender, white	1, 2	do.	24-30	6-10
Strawflower	Crimson, yellow, rose, salmon, white	1, 2	do.	30-40	8-10
Summer-cypress	(³)	1, 2	do.	30-36	18-24
Sunflower	Yellow, red, bronze	1, 2	do.	Feet 4-7	12-14
Sweet alyssum	White, violet, lilac	1, 2, 3, 4	do.	Inches 6-10	10-12
Sweet pea	Salmon, pink, blue, scarlet, rose, lavender, cream, white, purple	1, 2, 3, 4	do.	Feet 4-8	6-8
Verbena	Crimson, white, pink, lavender, blue, salmon, red, scarlet	1, 2	do.	Inches 9-12	18-24
Zinnia	Crimson, orange, pink, salmon, red, gold, white, yellow	1, 2	do.	18-36	8-12

¹ When to plant seed: 1, In frames or flats indoors for early flowering; 2, outdoors after last frost for later blooming; 3, late summer to early fall; 4, late fall.

² Also climbers.

³ No flowers; foliage green.

BRIEF DESCRIPTIONS OF ANNUALS LISTED IN TABLE 1

Ageratum

Ageratum is a bushy species with varieties that vary from 6 to 20 inches in height. It is an excellent bedding plant and is often used in rock gardens. The fluffy flowers are borne in dense heads from early summer until fall frosts. Ageratum grows well on a wide range of soil types and under various climatic conditions.

Babysbreath

Babysbreath is a dainty, free-growing plant much used in bouquets of mixed cut flowers. The varieties now available are white-, rose-, or carmine-flowered, but the white variety is the most popular. The various species and varieties vary in height from 12 to 18 inches. Seeds may be sown outdoors as soon as freezing weather is over or started indoors in flats for earlier bloom.

Balsam

Garden balsam, a native of India, likes hot sun, rich soil, and plenty of water. The plants are easy to grow from seed and flower quickly. Usually balsam is not given enough room to reach its full development, since the plants may spread out 12 inches or more. Balsam plants show to the best advantage when planted in groups in the border or at the top of a terrace or bank. The flowers are usually inconspicuous on the plants, but they are very attractive when cut and floated on water in decorative dishes.

For early flowers balsam seeds should be sown in a hotbed or a flat indoors 6 to 8 weeks before the last frost. As soon as the leaves appear, the young seedlings should be transplanted to thumb pots or to flats 2 inches apart each way. As soon as the weather conditions are suitable for tomatoes, the young balsam plants may be set outdoors. Seeds sown in the open ground as soon as freezing weather is past grow soon into beautiful plants, bearing large white or variously colored flowers.

Calendula

Calendula is a hardy annual 14 to 18 inches high. The plants grow best in a cool climate; therefore they are likely to be disappointing where the summers are hot. If the seeds are sown early indoors and large well-rooted seedlings are set out right after the last frost, good flowers may be had even where it is warm.

Calliopsis

Tall varieties of calliopsis produce graceful, long-stemmed flowers, excellent for cutting. There are also some dwarf varieties that make fine bedding plants. The principal flower color is a deep yellow, but some varieties have maroon and other colored flowers. Seeds may be sown indoors in flats about 8 weeks before the last frost or in hotbeds or in many sections outdoors after all frost is out of the ground. When finally transplanted the plants should be spaced 10 to 14 inches apart.



Calliopsis.

Candytuft

Candytuft is excellent for planting as the border of flower beds. It grows 9 to 12 inches tall. There are crimson-, lavender-, and white-flowered varieties. The plants are fairly hardy; and where the winters are not too severe, seeds sown in early fall produce plants that bloom very early in the spring. In areas with severe winters, seeds may be started indoors about 6 weeks before the last frost. This and

successive plantings made outdoors after the last frost will give a long season of bloom.

China-aster

China-aster is among the most desirable annual flowering plants provided it can be grown in sections free from the virus disease called aster yellows. Another serious trouble is aster wilt, which attacks the roots and stems and causes the plants to wilt and die. Wilt-resistant varieties are available, and these should be used where wilt is prevalent. The wide variety of size, color, form, and season of blooming makes China-aster one of the most satisfactory annuals for cut flowers.

When seeds are sown in the open ground in May, the plants usually bloom in September and October. For earlier blooming seeds should be sown indoors in March or early April. The seedlings transplant well, and large seedlings from early plantings soon become established in the garden.

Clarkia

Clarkia is among the prettiest of the hardy native annuals. It comes from west of the Rocky Mountains. Its free-blooming habit and the variety and brightness of its flowers make a bed of clarkia plants an attractive sight. Clarkia is useful, too, for hanging baskets, vases, edgings, or borders. The seeds should be sown indoors in early spring or outdoors in the fall. The plants should be grown in partial shade. Clarkia thrives in a warm, light soil and blooms from mid-summer to late fall. The height of the plants ranges from 18 to 24 inches.

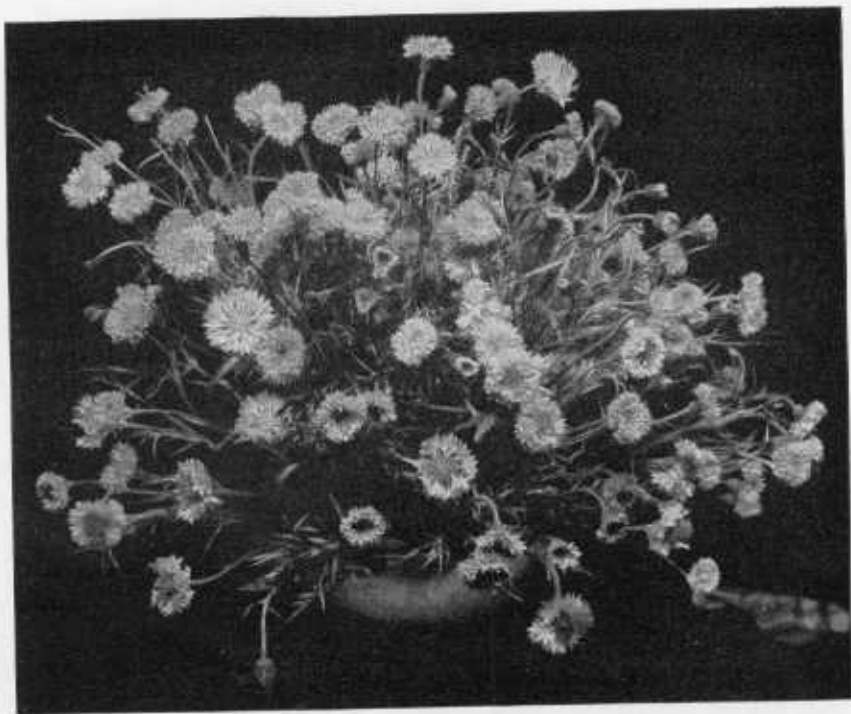
Cockscomb

Feather cockscomb, sometimes called plumed cockscomb, but more commonly known as celosia, is a tender annual growing 16 to 40 inches tall. It produces plumelike, graceful, showy flowers, either crimson or yellow. The plumes may be cut before they are fully open and dried for winter bouquets. Seeds may be sown outdoors after danger of frost is past, or they may be sown earlier under glass. Cockscomb prefers a light soil, not too rich, but it grows easily almost anywhere.

Cornflower

Cornflower is also known as bachelor's-button, bluebottle, ragged sailor, kaiserblume, and sometimes, erroneously, as "ragged-robin" and "bluet." These bright-flowered plants, which are hardy and require simple culture, are among the most attractive and graceful of the old-fashioned flowers. They bear blue, white, pink, or red blossoms. When placed in water, the cut flowers increase in size.

Preferably the seeds should be sown in the fall, but satisfactory flowers may be obtained if the seeds are sown in the spring from the time the ground is fit to work until the last of May in the North and the last of June in the South. The young plants should be thinned to 12 to 14 inches apart. They thrive well on all moderately rich garden soils. When once established cornflower usually reseeds itself year after year.



Cornflower.

Cosmos

Cosmos has been considered only a fall-blooming annual for so long that it is difficult for many gardeners to realize that this is no longer the situation. New early-flowering varieties with variously colored flowers are now available, and it is possible to have this attractive annual in flower from late June until frost.

Cosmos, with its feathery foliage and its height of 30 to 48 inches, makes a good background plant. Some of the taller varieties should be staked or planted close to a fence or natural windbreak. The best effects are attained when plantings are made in large masses rather than in rows.

For very early flowering seeds may be sown indoors a few weeks before the last frost, and the seedlings may be transplanted outdoors when the soil is warm. Outdoor plantings made at this time will come into flower later, but usually the plants are sturdier. The plants succeed under a wide range of conditions, but perform best in a well-drained soil and a sunny, wind-sheltered location. The flowers are excellent for cutting, keeping a long time, especially when put in water immediately after being cut.

Dahlia

The so-called annual dahlia is easily grown from seed, and the roots may be dug, stored, and replanted each year. Seeds should be planted early indoors when possible, but outdoor plantings when the soil is warm will produce good plants for late flowering. From seeds one

obtains a mixture of colors and also both double- and single-flowered forms. The flowers are borne in profusion, and the plants are graceful.

Forget-me-not

Like pansy, forget-me-not blooms most freely in fall and early spring. It makes a satisfactory close border, the beauty of which is heightened by its abundant bloom. It is also satisfactory as a winter-blooming plant for growing in cool rooms or coldframes. Another feature characteristic of forget-me-not is that, after having been introduced into a garden, it perpetuates itself from year to year by self-seeding just as poppy, portulaca, and several other desirable annuals do. Seeds may be sown in spring in a warm, sunny border if it is not too dry or in late summer in the South for winter bloom. Most varieties bloom freely the first season and profusely the second year if in a sufficiently cool, moist place, but the plants do not succeed so well in dry, sunny situations.

Four-o'clock

Four-o'clock, sometimes called marvel-of-Peru, gets its popular name from its habit of opening its flowers only late in the afternoon and on cloudy days. In its native region, tropical America, four-o'clock is normally a perennial, but in most gardens it is grown as an annual. In the northern part of the United States it is a tender annual, but even as far north as New York City it frequently manifests its perennial habit and develops tuberous roots large enough to be lifted and stored like canna roots.

The seeds may be sown under glass and transplanted about 12 to 14 inches apart after danger of frost is past, or the seeds may be planted at other times. Self-sowing also occurs. The plants, often used as a low screen, are fast-growing, erect, and bushy. The white, red, pink, yellow, lilac, or striped flowers are produced in late summer and fall.

Gaillardia

Gaillardia, or blanketflower, is easily grown and blooms freely. Blooming begins early and continues late in the fall. Gaillardia is well adapted to mixed borders. The orange, maroon, or other colored flowers, borne on stems of good length, keep fresh for a long time when placed in water. The flowers are single or double.

Gaillardias are propagated readily from seed sown where they are to grow soon after freezing weather is past, but they may be started under glass and be transplanted to their permanent location as soon as danger of killing frost is past. They may also be planted in the fall in some sections of the country. The plants should not stand closer together than 10 to 12 inches. Gaillardia grows and blooms best when fully exposed to sun and air and when planted on a fertile, light, well-drained soil.

Globe-amaranth

Globe-amaranth, sometimes called bachelor's-button, is an attractive and useful bedding plant, growing to a height of 18 to 24 inches. The flowers, which are predominantly reddish, somewhat resemble clover heads. They are often cut as everlasting. Seeds should be sown in the open ground soon after freezing weather is past, or they may be started under glass if desired.



Globe-amaranth.

Godetia

Godetia, which has an average height of 18 to 24 inches, is a close relative of the evening primrose. The native California godetia is



Godetia.

called farewell-to-spring. *Godetia* is a choice, free-blooming, hardy annual with wide-open, delicate rose, light-purple, white, or other colored flowers of satiny texture. It is suited to solid beds, pots, and shrubbery borders in partly shaded places where few other flowers flourish. The seeds may be sown in a coldframe or in the open ground in spring. If grown in a coldframe, the seedlings should be transplanted to stand 12 to 14 inches apart in rather thin or sandy soil. *Godetia* can be successfully treated as a biennial by sowing the seeds in July and in the North transplanting the young plants to a coldframe and setting them in the open the following May. The blooming season is from early spring until frost.

Larkspur

Larkspur is very valuable because of its rich-blue flowers, as blue flowers are comparatively rare among cultivated plants. The flowers



Larkspur.

are of various other colors, and one species produces red flowers. The flowers are single or double. The taller varieties, which may reach a height of 48 inches, are valuable for bedding and borders as well as for cut flowers. Other varieties only about 18 inches high are even better for bedding purposes. Larkspur is easily grown, but it does best in a rather cool, moist soil. The seeds may be sown either in late fall or in very early spring in some localities, but preferably the former, so that they will be ready to germinate early in the spring. The seedlings should be thinned to stand 6 to 8 inches apart, depending upon the variety.

Lupine

Lupine is a blue-, rose-, or white-flowered, hardy annual that succeeds well in sun. It may grow to about 24 inches in height and is useful in mixed borders, in beds, and for cutting. Seeds should be sown in the open ground just as soon as possible in the spring or earlier in flats indoors.

Marigold

Annual marigolds are of three rather distinct types known as African, French, and dwarf. Since they have somewhat different requirements, they are discussed separately.

African marigold is the tallest type, and during recent years many fine new varieties have been developed. It has a rather spreading type of growth and is well adapted to herbaceous or shrubby borders. The various varieties are the ones commonly called marigolds by American gardeners. The leaves and flowers are strong-scented, and the range of color is from sulfur yellow to orange. Seeds may be sown early indoors or outside when the soil is free from frost.

French marigold is more compact and regular in growth than African marigold, and for this reason it is more valuable for bedding or low borders. It forms an erect, compact plant covered with bright-



Marigold.

yellow to orange flowers. Seeds may be sown outdoors when the soil is warm or started 6 weeks earlier indoors.

Dwarf marigold forms very compact plants rarely more than 8 inches in height and bearing finely divided leaves. The plants bloom profusely and are ideal for edging flower beds.

Morning-glory

Morning-glory is a very satisfactory annual climbing plant for trellises and porches or to cover a fence. The new varieties that have been developed in recent years are a far cry from the morning-glories of yesterday. Their names (Pearly Gates, Heavenly Blue, and Scarlett O'Hara) are very aptly chosen, being very descriptive of the lovely pure white, glorious sky-blue, and rich red of their attractive flowers.

For very early flowering the seeds may be planted about 4 to 6 weeks before the last frost in a hotbed or flat indoors. If started in vermiculite the seedlings transplant readily. If soil is used, it is advisable to start morning-glories in thumb pots. The plants grow rapidly, sometimes growing as much as 12 feet or even more in one season, and they are in flower from July to the first frost.

Nasturtium

A wide range of colors, as well as double-flowered types, has been developed in the dwarf, or Tom Thumb, nasturtium, which for 3 or 4 months makes a better display than almost any other plant. No annual produces such a profusion of flowers for so long a time with the same outlay of time and labor. Nasturtium appears to thrive best on fairly poor soil, and when the soil is highly fertile it may produce vigorous foliage but few flowers. The seeds should be planted an inch deep just after the last frost, and the seedlings should be thinned to 8 to 12 inches apart. The rows should be not less than a foot apart. Flowering usually starts about 2 months from the date of seed sowing and continues throughout the season.

Pansy

Pansy is a popular annual very satisfactory for bedding. The flowers are usually yellow or purple and more or less splotted, but some newer varieties are blue, white, cream, or varicolored.



Pansy.

In much of the country where zero temperature is only occasional, pansy plants may be established in the fall and wintered over for early spring flowering. When the plants are handled in this manner, the seeds may be sown in late July through August and the plants set out in September so that they will develop heavy root systems before winter. When very severe weather is expected, such plants can be protected by a light mulch of straw or hay. In rugged climates young plants can be wintered over in glass-covered coldframes and then moved to permanent beds in the early spring.

Where it is not possible to handle pansies in this manner, seeds may be sown as early as possible in flats so that the young seedlings are ready to be transplanted outdoors as soon as the ground is suitable. Pansy plants will stand considerable frost and may be set out earlier than is generally known. The flowers are at their best during cool, moist weather and soon deteriorate in hot, dry weather.

Petunia

Petunia is among the best annuals for summer flowering, even where the temperatures are rather high. The young seedlings grow rapidly and soon come into flower. There are many varieties to choose from, and the number is continually increasing as the result of the work of plant breeders. The flower colors range from white through rose to purple.

Since the seeds are very small, it is advisable to sow them broadcast on the top of the seedbed medium. They may be covered with a light cloth to facilitate watering. As soon as the seedlings are visible, the cloth should be removed.

For best results the seeds should be sown indoors about 4 to 6 weeks before the last frost. The young seedlings should be transplanted



Petunia.

when very small to small pots or spaced about 2 inches apart each way in flats. As soon as all danger of frost is past, the young plants may be set in the garden. They soon begin to flower and continue to bear flowers until fall frosts.

Phlox

Drummond phlox is particularly useful and attractive when the seeds are sown so that they produce plants with masses of flowers



Phlox.

of contrasting colors. Few annual plants are more easily grown from seed, bloom sooner, or offer such a variety of colors to choose from as does phlox. Many varieties have reddish flowers, and some have violet or lilac ones. If given good soil, plenty of water, and full sunlight, phlox furnishes a supply of delicate flowers for cutting throughout the season. Phlox is also useful as a window-garden plant and may be used as an undergrowth for tall, bare-stemmed plants.

The first sowing of seeds may be made indoors or outdoors as soon as frost is out of the ground in the spring; another should be made a month later, either where the plants are to bloom or in a seedbed, as phlox transplants readily. In transplanting, set the plants 6 to 8 inches apart. The removal of flowers and seed pods makes the plants more bushy and compact and lengthens their blooming period. The average height of the plants is 6 to 12 inches.

Pink

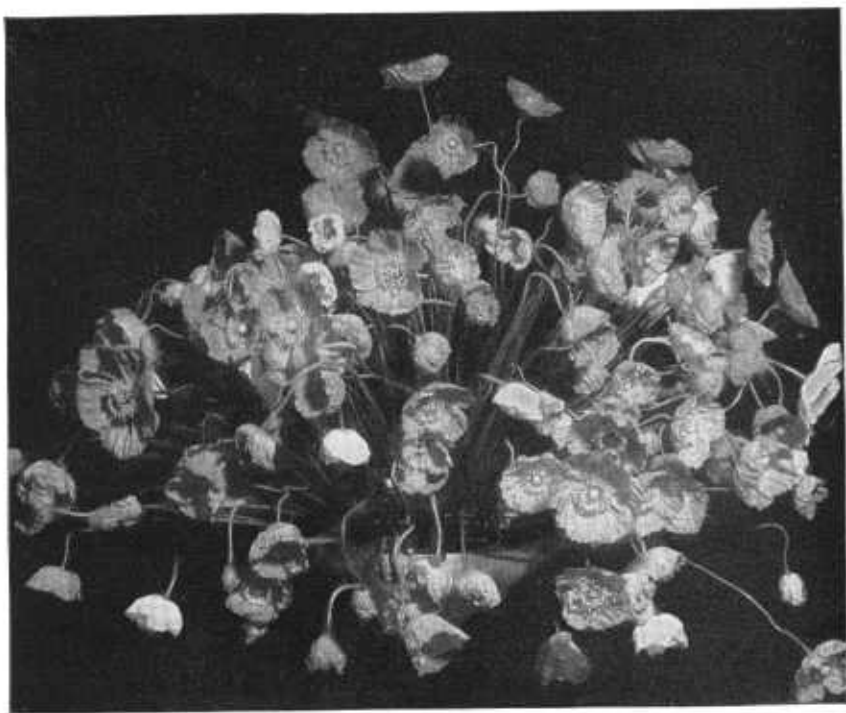
"Pink," or "dianthus," is the name of a large and varied group of plants all closely related to carnation. There are varieties with various heights and flower colors and types for practically all locations in the garden. Seeds may be sown indoors or in an open sheltered bed as soon as frost is out of the ground. The seedlings, which transplant easily, should be spaced 8 to 12 inches apart. Pinks are very satisfac-

tory for bouquets and flower arrangements, because they keep fresh and attractive a long time after being cut and placed in water.

Poppy

Gardens may begin to be gay with poppies even before all the tulips are gone. No other plants have such bold, brilliant flowers, ranging in color from white to gold, pink, and scarlet. They are useful for beds and borders, and some of them can be naturalized in open, wooded grounds. Others, like the Shirley poppy, can be used for cut flowers even though they last only a few hours.

Poppy will self-seed. Because it is hard to transplant and is set back even when transplanting is successful, it is well to sow the seeds where the plants are to bloom. A sandy loam suits poppies best. Seeds should be sown in the fall and at successive intervals in the spring so that there will be a succession of blooms. The seeds, which are very small, should be sown thinly and covered lightly. The plants should be thinned so that they are about 6 to 10 inches apart. They bloom best when the seeds are sown in the fall or while the ground still freezes at night.



Poppy.

Portulaca

The bright-flowered, thick-leaved portulaca, sometimes called sun plant, is unrivaled for brilliancy among low-growing plants. It flourishes under extremely adverse conditions, and hot sun and a sparse water supply will not destroy it even if it is growing on a

light sandy soil. It is satisfactory for beds, edgings, and rockwork and for filling irregular spaces or unexpected gaps in flower beds; as an undergrowth for taller plants it is valuable also. It carpets the ground with a mat of succulent foliage, which in the forenoon is hidden by the gayest of flowers, ranging through reds and yellows. *Portulaca* is particularly useful in the cooler sections of the country, such as the Northwest and parts of New England. The seeds, which do not germinate until hot weather, should be sown late. The plants require little care. Their hardiness is shown by the fact that they can be transplanted while in full flower even in dry, hot seasons. The average height is 6 to 9 inches.



Portulaca.

Rudbeckia

Rudbeckia, sometimes called coneflower, grows 20 to 24 inches tall. The daisylike flowers have brownish centers and bright, showy petals. The seeds may be sown outdoors as soon as danger of frost is past, or for earlier blooms they may be sown under glass. The plants respond to plenty of manure and like warm, sunny spots, but grow readily almost anywhere.

Salpiglossis

Salpiglossis, or painted tongue, produces unusually dainty, attractive, funnel-shaped flowers, ranging from white to purple and crimson, more or less veined with gold, and borne on slender, upright stems. The seeds should be sown early under glass or in the open ground as soon as danger of frost is past. Salpiglossis is not suited for bedding, but it is beautiful in borders or for cutting. It is a little more difficult to grow than some of the other annuals.

Scabiosa

Scabiosa, often called mourning bride, pincushion flower, and sweet scabious, is an easily grown, old-fashioned, half-hardy annual. It is very attractive and satisfactory both for cutting and for borders and beds. The flowers, which vary from white through rose, crimson, and blue to almost black, are borne on long stems. They keep a long time on the plant and when cut. The seeds should be sown indoors or in the open ground after danger of hard frost is past. The plants will bloom about 12 weeks after the seeds are sown.

Scarlet Sage

Scarlet sage, or salvia, is a standard bedding plant that keeps the garden bright with color until late fall. It lends itself to many uses; it makes a good pot plant, does well in window boxes, and is useful for cutting to give color to flower arrangements. It is used most commonly, however, as a hedge or border plant, giving long, broad bands of vivid color. On account of its very striking color, caution needs to be observed in using it in this way. Scarlet sage may be very effectively used in small clumps among or against masses of green.

The seeds should be sown in indoor flats or outdoor coldframes 6 weeks before the last frost, and the plants should be set in place after all danger of frost is past; or if protected from heavy rains and strong winds, the seeds may be sown outdoors about the date of the last frost so that they will not germinate until after all danger of frost is over. The plants grow and bloom profusely in any light, rich soil.

Snapdragon

Snapdragon is a valuable border plant. It is actually a perennial in sections where the winters are mild, but it is grown as an annual in other sections since it flowers the first season after seeds are sown in the spring. The brilliant colors and peculiar form of the flowers always attract attention. The many varieties range from dwarfs about 10 inches tall to forms as much as 36 inches tall. The new tetraploid (tetra) varieties have larger flowers and heavier stems than the older varieties. The spikes are very useful for cut flowers, because they keep fresh a long time. From seeds sown in the open ground when danger of frost is past, blooms are obtained in about 10 weeks. For early flowers the seeds should be sown under glass and transplanted to beds of warm, dry, moderately enriched soil. If protected by a coldframe or even a mulch of leaves in the North, the plants will winter well and bloom early the following year. Snapdragon, like most

other perennials or biennials which bloom the first year and of which a particular display is desired, should be treated as an annual and sown every year. Snapdragon is easy to grow and blooms freely and continuously until frost.



Snapdragon.

Spider Plant

Spider plant, or cleome, may grow to a height of 36 inches and forms large, loose heads of salmon-pink flowers borne well above the foliage for a long season. The seeds may be sown in the open ground soon after the weather is settled, or 2 or 3 weeks before the last frost may be expected. Spider plant is easy to grow.

Stock

Stock is beautiful in areas where it can be grown. It requires a cool, moist climate, and the plants fail to flower where they are not exposed to cool (50° to 55° F.) temperatures for at least a week or so after they are 6 to 8 inches tall. Stock is hardy and will tolerate light frosts if properly hardened off before exposure. It is not advisable to try stock in areas where spring and summer temperatures are high. Stock is good for winter flowers in much of the South and for summer ones in New England and the Pacific Coast States. It also performs very well in summer in the Rocky Mountain areas where nights are cool. For very early flowers, seeds should be sown indoors about 6 weeks before the last frost, and the seedlings should be transplanted outdoors as soon thereafter as possible.

Strawflower

Strawflower is an attractive, easily grown, hardy annual, bearing double flowers of various colors and an inch and a half across. The plants are very effective for beds and borders, and the flowers may be cut and dried for winter bouquets. They succeed in any good garden soil, but respond to plenty of fertilizers. The seeds may be sown in the open ground as soon as all danger of frost is past. The plants do better, however, if transplanted once or twice. They should have plenty of room to develop, being planted not closer than 8 to 10 inches apart. They grow to a height of 30 to 40 inches.

Summer-cypress

Summer-cypress, also called standing cypress and Mexican flame plant, is useful for pale-green mass or formal effects. The foliage is fine, light in color, and very effective when the plants are used in masses. When grown with plenty of room summer-cypress forms uniform, oval, symmetrical specimens up to 36 inches high. For specimen plants they should be set at least 48 inches apart and for a hedge 18 to 24 inches. Summer-cypress does not thrive in shade; the part that is shaded fails to grow, and the plant becomes one-sided. As it approaches maturity, the whole plant gradually turns crimson.

Sunflower

Sunflower is a bright-flowered annual that has not received the attention it deserves. The tall, large-flowered sorts, as well as the dwarf, many-flowered varieties, are useful when skillfully employed in mixed plantings with other herbaceous annuals. The yellow, red, or bronze disks are like sunbursts among the shrubbery. The tall habit and dense foliage of some varieties make them suitable for backgrounds and screens. Because of their long stems and extraordinary lasting quality the flowers are valuable for cutting.

Sunflower is easy to grow. The seeds should be planted in the open garden in spring at about the time that corn or beans are planted, or about a week after the average last frost. The plants should be thinned to stand 12 to 14 inches apart, depending upon whether a dwarf or a tall variety is being grown. The height of the different varieties ranges from 4 to 7 feet, while the habit of growth, character of foliage, and number of flowers vary correspondingly.



Sunflower.

Sweet Alyssum

Sweet alyssum is a very easily grown plant with dainty little flowers. It is recommended for liberal use in borders, edging, baskets, pots, and rockwork and for cutting. For borders the seeds should be sown thickly, so as to form masses. For winter bloom the seeds should be sown late in August and the seedlings should be thinned to stand about 10 to 12 inches apart, but for spring bloom in borders the seeds may be sown in the open ground early in the spring or even late in the preceding fall in some localities. Where the plant will not endure the winter, however, early spring planting under cover, in a cold-frame, a spent hotbed, or a box in a dwelling is best. Sweet alyssum also can be increased from cuttings made from strong, new side shoots as well as by division of the roots.



Sweet alyssum.

Sweet Pea

Annual sweet pea is an old favorite in all regions where it can be grown. It thrives in a cool, moist climate and is at its best on the Pacific coast and at high altitudes, where the summer nights are cool and showers frequent. In many parts of the South and even as far north as Richmond, Va., seeds may be planted in the late fall for very early spring flowering. Where some cold weather is expected, such plantings should be protected with a light mulch, often provided by using small branches of trees over the row and piling straw or leaves on them to give added protection. Where winters are mild, plantings are made in September for winter flowering. In the North seeds may be started indoors in thumb pots about 4 to 6 weeks before the last frost or later outdoors just as soon as the soil can be worked.

Sweet peas like a cool soil about their roots. This condition is helped to some extent by having the roots develop as deep as possible. Such development may be attained by planting in trenches and gradually filling in the soil about the plants as they grow.

Verbena

Verbena is a low-growing, creeping annual. The flowers are borne on terminal or lateral shoots, which stand up about 5 to 7 inches above the plant. Verbena is useful for beds, borders, mounds, and window boxes as well as for cut flowers. It blooms over a long period, early

summer until frost. When grown in mass the plants make a carpet of white, pink, scarlet, blue, or other colored flowers.

Verbena is now raised from seed because it comes true in form and color. For the earliest bloom the seeds should be sown indoors at least a month before the ground stops freezing at night. When the seedlings are about an inch high, they should be transplanted to thumb pots or flats. The plants should be set about 3 inches apart each way. When all danger of frost is past the plants should be set 18 to 24 inches apart in a bright, sunny location. The soil should be rich and compact, but well drained. Verbena seeds may also be planted later indoors or outdoors just after the danger of frost is past.

Zinnia

Zinnia is one of the most satisfactory of all the annual flowering plants. It will tolerate considerable summer heat, coming as it does from Mexico, where the wild species thrives in full desert sun. This annual has received considerable attention from plant breeders, and the old-fashioned, rather coarse plant with ragged-looking flowers has been replaced with a large number of varieties having flowers of many colors, heights, and forms. It is a very easy annual to grow. The seeds may be sown indoors about 4 weeks before the last frost or outdoors as soon as the soil is warm. The plants thrive in full sun and like plenty of moisture and a good, strong, rich soil.

Zinnias are fine for cutting, lasting a long time, and for this purpose are often grown in rows. They make their best appearance, however, when planted in masses.



Zinnia.

U. S. GOVERNMENT PRINTING OFFICE: 1950

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 15 cents